



AMIE

FUNDAMENTALS OF DESIGN AND MANUFACTURING



(Group A)

Engineering design process and its structure. Identification and analysis of need, product design specifications, standards of performance and constraints.

Searching for design concepts: Morphological analysis, brainstorming. Evaluation of design concepts for physical reliability, economics, feasibility and utility.

Detailed design: Design for manufacture, assembly, shipping maintenance, use, and recyclability.

Design checks for clarity: Simplicity modularity and safety. Standardization and size ranges. Reliability and robust design. Design organization and communication technical reports, drawings, presentations and models.

Concept of manufacturing: Classification of manufacturing processes. Fundamentals of casting. Basic understanding of commonly used casting processes (sand casting, investment casting and permanent mould casting processes).

Fundamentals of metal forming: Hot and cold working ; basic understanding of primary metal forming processes (rolling, forging, extrusion metal forming processes, punching and blanking).

(Group B)

Fundamentals of metal cutting: Tool-work interaction for production of machined surfaces. Classification of machining processes. Basic machining operations (turning, shaping, planning, drilling and milling processes).

Fundamentals of grinding and finishing: Overview of unconventional machining processes ; fundamentals of welding processes; introduction to primary welding and allied processes; selection of manufacturing processes. Design for manufacturability.

Need for integration: Commercial, economic and technological perspective; basic tools of integration; concept of a system. Introduction to information technology and its elements.

Introduction to group technology: Introduction to simulation and database management system.

Elements of integration: Controllers, sensors, robots, automated machines; AGVs, AS, RS, etc.

Product and process design for integration: Design for economic manufacturing; design for manufacturing integration.

Introduction to computer aided process planning; selection of machine tools.

Recommended Books:

G.K. Lal, Vijay Gupta and N Venkat Reddy. ***Fundamental of Design and Manufacturing***. Narosa Publishing House, New Delhi

Surendra Kumar and M K Tiwari. ***Fundamentals of Design and Manufacturing***. IEI Study Material.

G Dieter, Engineering Design, McGraw-Hill International

G K Lal and S K Choudhary. ***Fundamentals of Manufacturing Processes***. Narosa Publishing House, New Delhi.

S K Vajpayee, ***Principles of Computer Integrated Manufacturing***. Prentice-Hall of India (P) Ltd., New Delhi